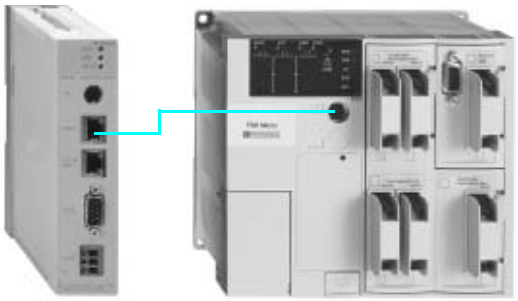
Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link



TSX Micro platforms connect to the Ethernet TCP/IP network via 2 external and autonomous TSX ETZ 410/510 modules. These modules are also used to link to an external modem.

Ethernet TCP/IP TSX ETZ 410 module

The TSX ETZ 410 module includes:

■ A Modbus/Uni-TE TCP/IP communication profile on Ethernet 10/100 Mbits/s or TCP/IP via RS232 serial link connected to an external 56K bit/s modem.

■ The integrated Web server function. The integrated Web server provides access to:
- □ the module configuration,
- □ the PLC diagnostics system function, “Rack Viewer”,
- □ the communication diagnostics function,
- □ the access function to the PLC data and variables, “Data Editor”,
- □ and accepts the scanned input/output function; the TSX ETZ 410 can be scanned by a device which supports the exchange of I/O Scanning input/outputs.

Ethernet TCP/IP TSX ETZ 510 module

The Ethernet TSX ETZ 510 uses all the functions of the TSX ETZ 410 module, and in addition, the following functions on the level of the integrated Web server function.

■ Graphic object editor function to assist in creating Web user pages.

■ Configuration tool for the integrated WEB server.

Integration into structures

The Ethernet TSX ETZ 410/510 modules communicate with the Micro TSX 37 10/21/22 PLCs, which are equipped with the operating system version IE ⩾ 2.0. They connect:

■ Via the:
- □ TSX 37 10/21/22 PLC terminal port (TER),
- □ TSX 37 21/22 PLC auxiliary port (AUX),
- □ TSX SCP114 serial link PCMCIA card inserted into the TSX 37 21/22 PLC.

■ On a Uni-Telway bus, via the TSX SCA 50 derivation box or the TSX P ACC 01 isolation box.

The Ethernet TSX ETZ 410/510 modules are configured with the assistance of a standard browser using:

■ The Ethernet network.
■ RS 232C serial link (PPP protocol).

The Ethernet TSX ETZ 410/510 modules ensure that the TSX Micro PLC TER port is duplicated; the PLC connected to the TSX ETZ 410/510 module via this TER port can be accessed locally by a programming terminal equipped with PL7 TSX Micro/ Junior/Pro software.

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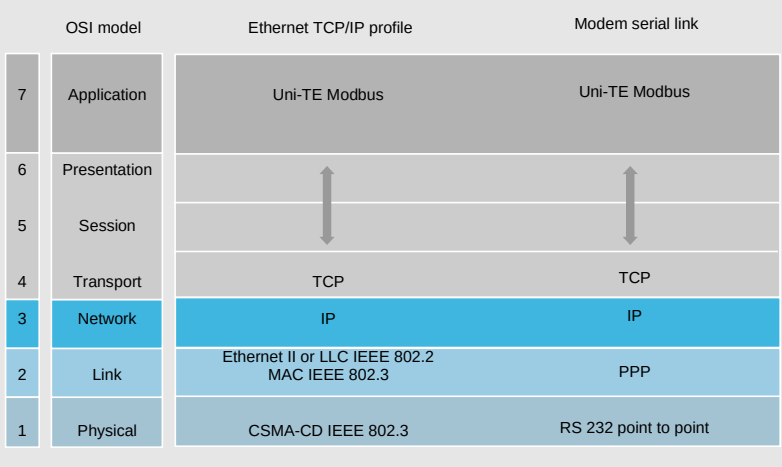
TCP/IP profile on Ethernet and on the serial link by modem

Summary of the OSI structure



The distributed automation applications can use a unique communication network which meet:
■ The needs of real-time workshop performance.
■ The open access requirements for the monitoring/commanding software based upon products using standard communication protocols or applications using Internet technology.
Ethernet and the point to point protocol (PPP) via serial link respond to different requirements in terms of data rate, capacity for open access on TCP/IP and flexibility in terms of topology.

Ethernet communication affects essentially the following applications:

■ Co-ordination between programmable PLCs.

■ Local or centralized supervision.

■ Communication with production information management.

■ Communication with remote inputs/outputs.

The various services offered are as follows:

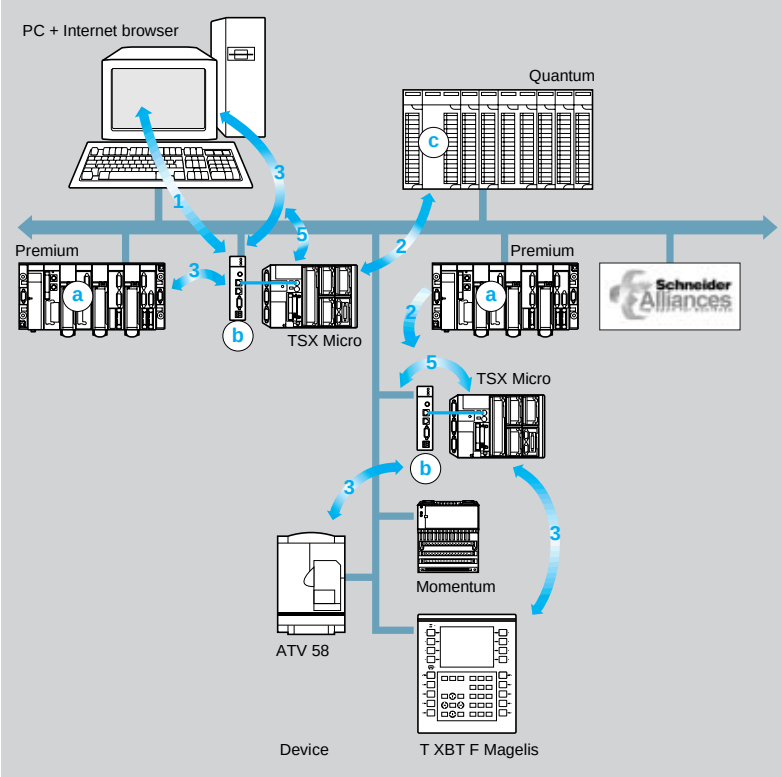
■ The TCP/IP protocol standard permits communication with:
□ the Quantum platforms in the Modbus messaging, with the 140 NOE 771 ●● module,
□ the M1E CPUs associated with the Momentum inputs/outputs I/O base in Modbus messaging,
□ the Premium platforms with TSX ETY 110 module (outside of Ethway profile) or TSX ETY 410●/510● module,
□ a PC terminal, which supports a standard browser for the Ethernet network,
□ a PC terminal, with a modem which supports a standard browser for the serial link,
□ all Uni-TE/Modbus TCP/IP devices (ATV 58 drive, Magelis terminals, etc.).

■ The SNMP V1 network agent function. All Ethernet modules integrate the MIB II standard (Management Information Base RFC 1213) and the Ethernet Transparent Ready private MIB. These are compatible with the main network administration software available on the market.

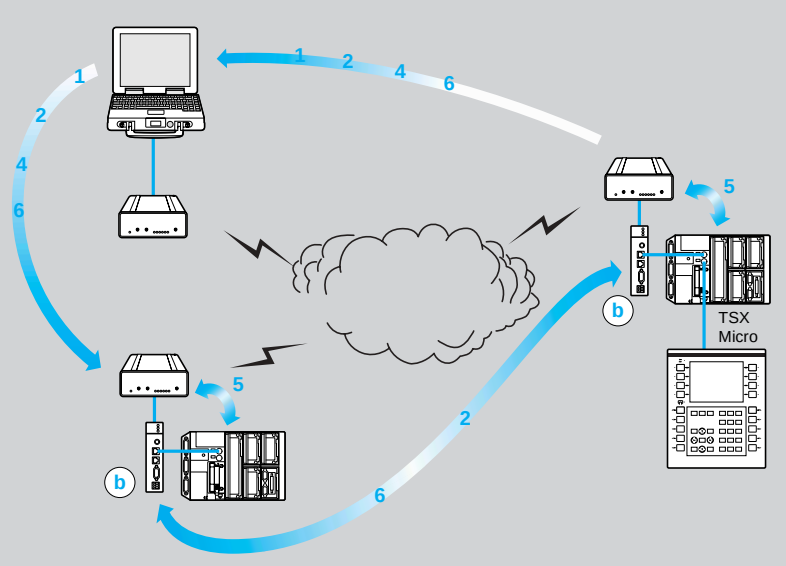
Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

Ethernet link



Modem link



1, 2, 3, 4, 5 and 6 See functions on page 43312/5.

a Premium Ethernet TSX ETY 410●/510● module.
b TSX Micro Ethernet TSX ETZ 410/510 module.
c Quantum Ethernet 140 NOE 711 ●● module.

Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

Services linked to Ethernet applications

The TSX ETZ 410/510 modules integrate the services linked to the Ethernet applications:

1 Integrated Web server services:
- IP configuration for the TSX ETZ 410/510 via standard browser on the Ethernet network or locally,
- Access security,
- PLC diagnostics system Function “RackViewer”,
- Communication diagnostics function,
- Access function to the PLC data and variables, “Data Editor”,
- Download of Uni-TE PL7 applications,
- Graphic object editor (only on TSX ETZ 510),
- display of predefined Web pages,
- User Web pages (only on TSX ETZ 510).

2 Scanned inputs/outputs service performed from the Premium or Quantum PLC (I/O Scanning function).

3 Uni-TE messaging in TCP/IP in Client/Server mode:
- Remote terminal: Terminal transparence (see page 43301/3).

4 Un-TE messaging in TCP/IP in Client/Server mode:
- Conversion of Modbus requests to Uni-TE requests going to the TSX Micro PLC and vice versa for the reply.

5 TCP/IP messaging gateway to Uni-TE.

6 API calling/called (only for Modem link).

Standard Ethernet services for TSX ETZ 410/510

The TSX ETZ 410/510 modules conform to the following standard protocols:

■ BOOTP: attribution of IP address via a server (also for addressing by default or from a PC equipped with a standard browser).

■ DHCP *(1)*: automatic reconfiguration by replacing a faulty module (FDR function).

■ SNMP *(2)*: *network management protocol. The TSX ETZ 410/510 modules integrate the standard MIB II and the private Ethernet Transparent Ready MIB*.

(1) Only for Ethernet link:
***Bootstrap Protocol**: protocol for starting up terminals or stations without a disk via centralized management of network parameters.*
***Dynamic Host Configuration Protocol**: protocol, which allows a station connected to a network to dynamically obtain its configuration.*

*(2) **Simple Network Management Protocol**: Network management protocol which is used to monitor a remote network by requesting the status of the stations and modifying their configuration, performing security checks and observing various information linked to data transmission. It can also be used to manage remote data bases and software.*

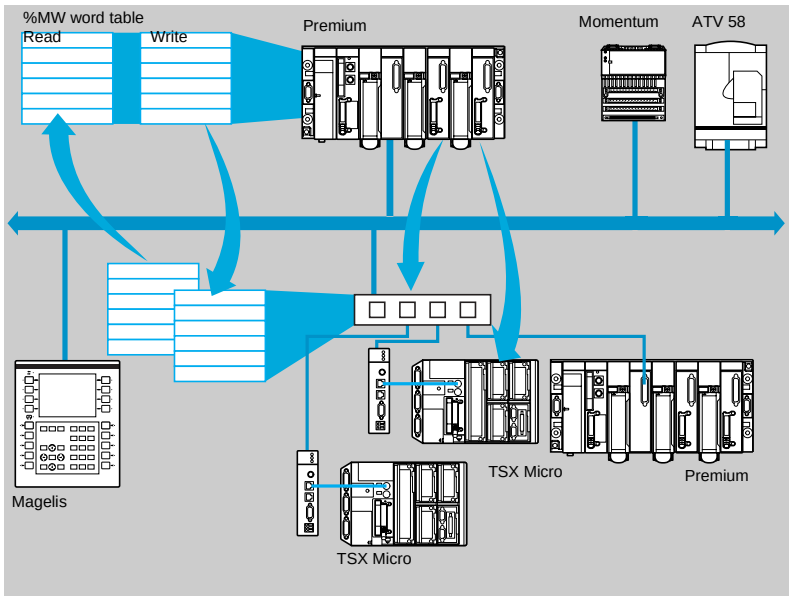
Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

Scanned inputs/outputs service

The Ethernet ETZ 410/510 modules for the TSX Micro PLC accept the scanned I/O service, which is performed by the Premium or Quantum modules using the I/O Scanning service (TSX ETY 410●/510●, 140 NOE 771 ●●).

Flow chart



This service is used to manage the exchange of remote inputs/outputs on the Ethernet network after a simple configuration and without the need for specific programming.
Inputs/outputs are scanned transparently with the assistance of read/write requests according to the Modbus protocol on the TCP/IP profile. This principle of scanning via a standard protocol is used to communicate with any device supporting a Modbus server on TCP/IP or with a built-in Modbus/Uni-TE converter on TCP/IP.

Integrated Web server

The Ethernet TSX ETZ 410/510 modules have an integrated Web server. On a TSX Micro PLC level, the functions of the Web server allow:

- configuration,
- diagnostics,
- access to variables,
- graphic editing,
- display of predefined Web pages and
- use of a Web page configuration tool.

This server is a PLC real-time data server. All TSX Micro PLC CPU data which support one of these modules are presented in the form of standard HTML-web pages and can also be accessed by all standard browsers capable of embedded Java or by FactoryCast software (supplied on CD-Rom with each Ethernet module).

All functions from the Web server do not require any configuration or programming, either on the level of the TSX Micro PLC, or on the level of the compatible PC which supports the Internet browser. Furthermore, this module can be used in an existing configuration without any modification to the current program.

Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

Configuration function

The configuration function for the module is a predefined function. It allows:

- Altering the user name and password for access to the secure page.
- Configuration of the TCP/IP parameters.
- Configuration of the Uni-Telway parameters.
- Automatic re-configuration.
- Configuration of the SNMP parameters.
- The module reset.

"Rack Viewer" function, TSX Micro PLC diagnostics

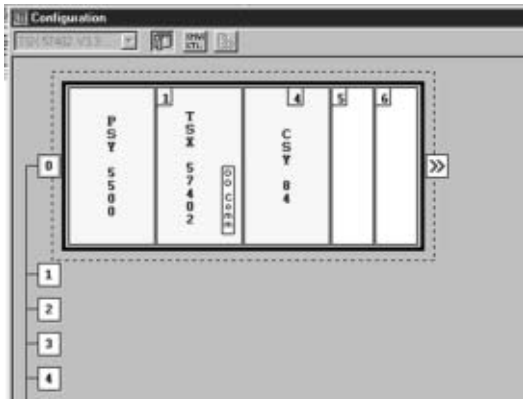
The predefined "Rack Viewer" function (display of PLC rack) is used to diagnose the TSX Micro PLC connected to the network via the Ethernet module. This is a predefined secure function (accessed using a password) which allows real-time display from a standard browser:

- The status of the LEDs on the front panel of the PLC.
- The version type of the PLC.
- The hardware configuration of the PLC with the status of the system words and bits.
- The detailed diagnostics of each I/O module or application share this configuration.

Communication diagnostics function

The communication diagnostics function is a predefined secure function (accessed using a password) which allows real-time display from a standard browser:

- The Ethernet network statistics.
- The Uni-Telway bus statistics.
- The RS 232 Modem serial link diagnostics.



"Data Editor" function, access to the PLC data and variables

The access to the variables function is a predefined and secure function (accessible by password) allowing the creation of an events table to access the list of PLC variables in read or write.

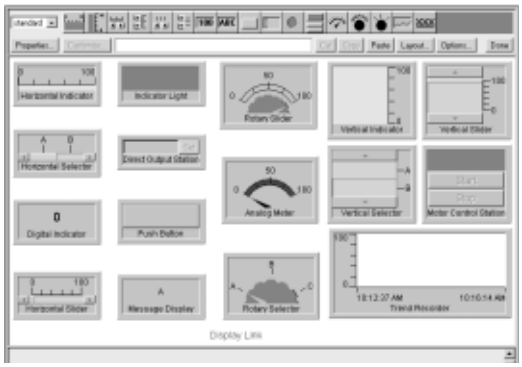
The variables to be displayed can be entered and displayed as:

- Address (%MW99) for the TSX ETZ 410 module.
- Symbol (S_Pump 234) or address (%MW99) for the TSX ETZ 510 module.

In order to be able to write a value in a variable, you will need to enter and confirm a second password. The animation tables created by the operator can be saved in the Ethernet TSX ETZ 410/510 module.

Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

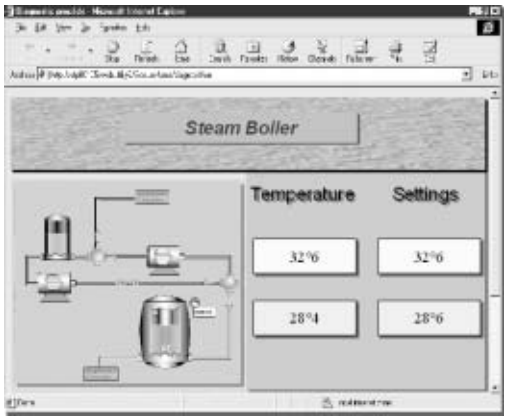


Graphic object editor function

(available on the TSX ETZ 510 module)

The graphic object editor function enables you to create graphic designs, including animated graphic objects, linked to PLC variables.
These customized designs can be used in user Web pages created with FactoryCast software.

These designs are created using simple cut/paste operations and the objects are set according to the needs of the user (color, PLC variables, label…). Once the designs have been created, they can be saved in a transparent way in the Ethernet TSX ETZ 510 module.



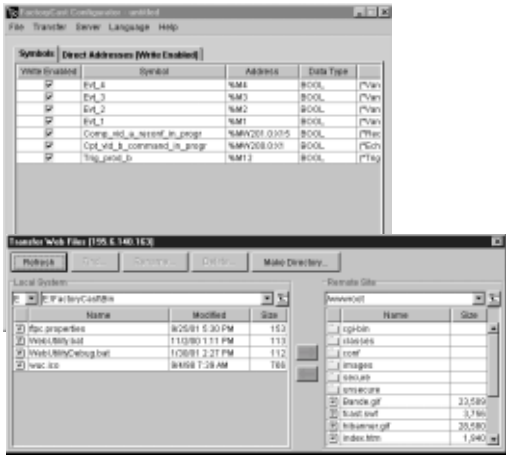
Display of predefined Web pages

(available on the TSX ETZ 510 module)

The TSX ETZ 510 module also has an 8 M bytes *(1)* Flash EPROM type memory, which is accessible as a hard disk and permits the reception (hosting) of Web pages defined by the user.
These Web pages can be created using any standard tool that lets you create and edit in HTML format. Eight pages can be enhanced by inserting animated graphic objects provided by the graphic object editor.

Once created, these Web pages allow you to:
- Display all PLC variables in real time.
- Insert hyperlinks to external servers (documentation, suppliers…).

This function is particularly useful for creating graphics and images intended for:
- Display, monitoring, diagnostics.
- Development of real time production reports.
- Maintenance assistance.
- User guides.



FactoryCast configuration tool for the integrated WEB server

(only available on the TSX ETZ 510 module)

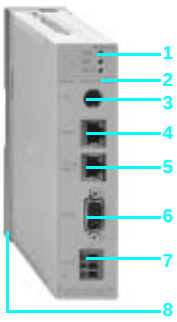
The FactoryCast software, version > 2.2.1 (supplied on the CD-Rom with the TSX ETZ 510 module), allows you to configure and administer the Web server embedded in the module. It is common to the TSX Micro, Premium and Quantum automation platforms.

It provides the following functions:
- Access security.
- Definition of the User names and associated passwords to access the Web pages.
- Definition of the access to the variables authorized in modification.
- Access to the PL7 application and to the TSX Micro PLC data.
- Save/restore a complete Web site.
- Transfer of Web pages created in local mode by the user on a PC-compatible workstation to the TSX ETZ 510 module and vice versa.

(1) Memory that is insensitive to power outages and to PLC resets.

Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link



Description of the TSX ETY 410/510 modules

The Ethernet TSX ETZ 410/510 modules are autonomous and thus do not fit into a TSX Micro PLC rack, but fix onto a DIN profile or on AM1-PA perforated mounting plate.

The front of the TSX ETZ 410/510 modules are arranged as follows:

1 Three display LEDs indicating the module status (RUN, ERR, RX/TX).
2 A screened-on label indicating the module's MAC address (default address set in the M bit).
3 A mini DIN connector for terminal port (TER address).
4 An RJ45 connector for Uni-Telway auxiliary port RS 485 serial link (RS 485 address).
5 An RJ45 normalized connector for connecting to the Ethernet network (10/100BASE-T address).
6 A 9 pin male SUB-D connector for RS 232 serial link (Modem).
7 A screw terminal block for connecting to the external power supply ⎓ 24 V.
8 A support plate enabling it to be fixed to the module.

Wiring system

The TSX ETZ 410/510 modules support two kinds of exclusive TCP/IP connections:

■ By Ethernet network via 10BASE-T/100BASE-TX (RJ45) interface, see page 48190/7 for accessories and connection cables.

■ By Modem via RS 232 serial link, see page 43606/2 for accessories and connection cables.

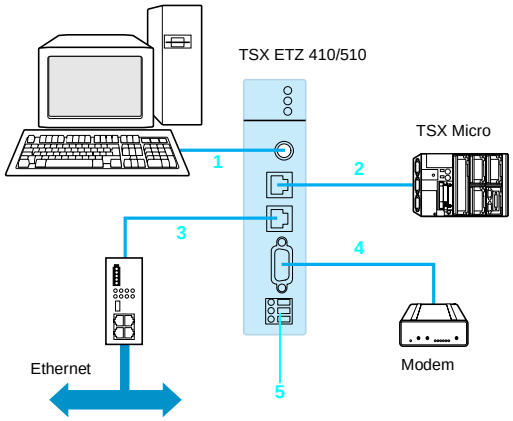
The TSX ETZ 410/510 modules are connected to the TSX Micro PLCs TSX 37 10/21/22 via:

■ The terminal port (TER) or the auxiliary port (AUX).

■ The PCMCIA RS 485 TSX SCP114 serial link.

Flow chart

The wiring chart opposite corresponds to one of the methods of connection.
The TSX ETZ 410/510 module is attached to the TSX Micro PLC via its terminal port (TER or AUX).



1 **TSX PCU 1031**: Uni-Telway connection cable between a compatible PC and the TER port of the TSX ETZ 410/510 module.

2 **TSX ETZ CDN 003**: connection cable (0.35 m cable, supplied with the TSX ETZ 410/510 module) between the module (rep. RS 485) and the TER/AUX port of the TSX Micro PLC. The **TSX CX 100** cable authorizes a connection with longer lengths (up to 10 m).

3 **490 NTW 000●●**: shielded twisted pair cable connection right of the module (rep. 10BASE-T/100BASE-TX) to Ethernet via hub (see page 48190/7). Length from 2...80 m.

4 RS 232 cable between the SUB-D 9 connector contacts of the module (rep. RS 232) and the Modem.

5 Connection for external power supply ⎓ 24 V (see Phaseo power supply page 14055/3).

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Ethernet network and TCP/IP Modem serial link

Characteristics of the TSX ETY 410/510 modules

Type of link			Ethernet	Serial link by Modem
Structure	Nature		Local industrial heterogeneous network which conforms to the IEEE 802.3 standard	Telephone line *(1)*
	Topology		Star-shaped or tree-structure network	–
	Physical interface		–	RTC Link
	Protocol		–	Point-to-point protocol
Transmission	Mode		Manchester-type baseband	Half or full duplex
	Binary data rate		10/100 M bit/s with automatic recognition	RS 232 link to 56 K bit/s max
	Medium		10BASE-T, double shielded twisted pair of type STP, impedance 100 Ω ± 15 Ω 100BASE-T, Ethernet cable category 5 conforms to standard EIA/TIA 568A	Shielded RS 232 cable (crossover DTE/DTE)
Configuration	Number of stations		Point-to-point connection (via normalized RJ45 connector) enabling a star-shaped network to be formed (the stations are linked to hubs or switches). 64 stations max. per network	2 (point to point link)
	Length		100 m max. between terminal device and hubs	–

Services and functions supported by the module

Shared services			Different shared services: - scanned inputs/outputs service performed from the Premium/Quantum PLC with the I/O Scanning function - inter-PLC communication in Uni-TE or Modbus TCP/IP - download of Uni-TE PL7 applications - diagnostics module - remote terminal: Terminal transparence (see page 43301/3) - adjustment, debugging and modifications to the program
TCP/IP services			in Uni-TE: - client/server mode (32 simultaneous connections) - 128 byte client/server requests (synchronous mode) - 1Kbyte client/server requests (asynchronous mode)
			In Modbus: - client/server mode (32 simultaneous connections) - 128 byte synchronous requests
Integrated Web server function *(2)*			Different Integrated Web server services: - maximum simultaneous connection of 8 standard browsers - IP configuration for TSX ETZ 410/510 module via standard browser - PLC diagnostics system function “RackViewer” - communication diagnostics function - access function to the PLC data and variables “Data Editor” - graphic objects editor *(3)* - Web pages defined by the user (8 Mb available) *(3)*

Electrical specifications

Supply voltage	Nominal	⎓	24
	Limits	⎓	19.2…30
Wave rate			5% max.
Accepted micro-cuts		**ms**	1
Permitted overvoltage		⎓	34 max. (for 1 hour in 24)
Power consumption	Nominal	**mA**	100
	Limits	**mA**	50…200
Power dissipation		**W**	2.4 (4 max.) without consumption on terminal port

Environment

Conforming to standards			The TSX ETZ 410/510 modules conform to the TSX Micro PLC requirements (see page 43050/11), which meet the following standards: ISO/IEC 8802-3, ANSI/IEEE Std 802.3 (4th edition 1993-07-08), conforming to the FCC-B rule for radiated emissions (50082-1)

(1) Transmission via Modem can also be by radio or satellite.
(2) Requires a standard browser on the PC (i.e. Internet Explorer version 4, Netscape version 4.05 or other) which is capable of executing Java code.
(3) Services available on the TSX ETY 510 module.

Presentation: page 43312/2 | Description: page 43312/9 | Functions: pages 43312/4 to 43312/8 | References: page 43312/11 | Dimensions: page 43312/11

Telemecanique

Modicon TSX Micro automation platform

Ethernet network and TCP/IP Modem serial link

Ethernet TCP/IP network modules

TSX ETZ 410/510

Designation	Data rate and communication profile	Integrated Web Server		References	Weight
		Diagnostics	Web user pages		kg
Ethernet modules for Micro TSX 37 10/21/22 PLC *(1), (2)*	Ethernet 10/100 Mbps or Modem 56 Kbps Uni-TE on TCP/IP or Modbus on TCP/IP	yes	–	**TSX ETZ 410**	0.280
		yes	8 Mb available	**TSX ETZ 510**	0.280

Connection cables and accessories

Designation	From	To	Use	Length	References *(3)*	Weight kg
Ethernet twisted shielded cables *(3)*	TSX ETZ 410/510 module (RJ45 connector add. ETH)	Ethernet Hub (RJ45 connector) See page 48190/7	Link to Ethernet network	2 m	**490 NTW 000 02**	–
				5 m	**490 NTW 000 05**	–
				12 m	**490 NTW 000 12**	–
				40 m	**490 NTW 000 40**	–
				80 m	**490 NTW 000 80**	–
RS 485 Uni-Telway cables	TSX ETZ 410/510 module (mini DIN connector add. TER)	Compatible PC (female SUB-D 9 pin connector)	Uni-Telway bus link via terminal port	2.5 m	**TSX PCU 1031**	0.140
		TSX SCA 50 connection box	Uni-Telway bus link via terminal port	10 m *(4) (5)*	**TSX CX 100**	–
Terminal port (TER) connection box	Uni-Telway derivation bus	TSX ETZ 410/510 module or TSX Micro PLC (mini DIN connector add. TER)	Uni-Telway bus isolation signals for buses > 10m in length, end of line adaptation, bus cable derivation	1 m (TER port link cable)	**TSX P ACC 01**	0.690
Passive derivation box	Uni-Telway derivation bus	TSX ETZ 410/510 module (mini DIN connector add. TER)	Derivation and prolonging of bus cable, end of line adaptation	–	**TSX SCA 50**	0.520

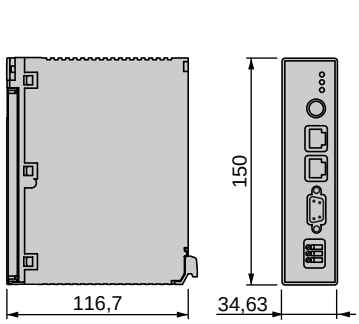
TSX P ACC 01

TSX SCA 50

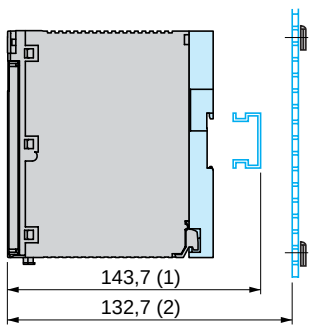
(1) Requires a TSX 37 10/20/21 PLC with a version ≥ 2.0 operating system, supplied with a TSX ETZ CDN 003 link cable (0.35 m in length). These modules should be supplied with ⎓ 24 V. (See supply process page 14055/3).
(2) Supplied with CD-Rom including the FactoryCast V2.2.1 software, the Ethernet Transparent Ready Part A, the user manual for the Ethernet TSX ETZ 410/510 modules.
*(3) Add the letter **U** to the end of the reference for CSA 22.1, NFPA 70 and UL approved cables (flame-retardant).*
(4) Free wire on the side of the TSX SCA 50 connection box.
(5) If the 0.35 m of TSX ETZ CDN 003 cable, supplied with the TSX ETZ 410/510 modules, is not suitable, it is possible to use the TSX CX 100 cable (10 m in length). In this case, attach an 8 pin RJ45 connector (category 5) to the end of the free wire.

Dimensions, mounting

TSX ETZ 410/510 modules



Mounting on profiled AM1 DE200 or AM1 DP200 or on AM1 PA mounting plate



(1) 136.2 mm with profiled AM1 DP200
(2) Assembly on AM1 PA mounting plate